

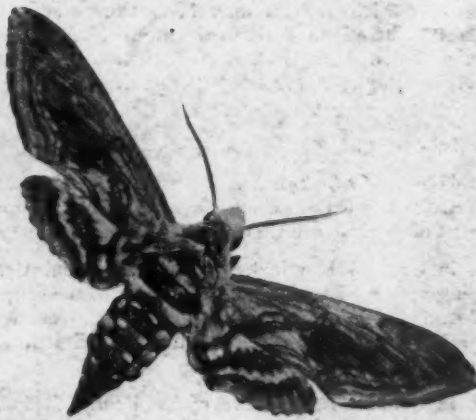
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VOL. 3

April, 1906

NO. 7

The Cornell Countryman



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COLLEGE OF AGRICULTURE
ITHACA, N. Y.

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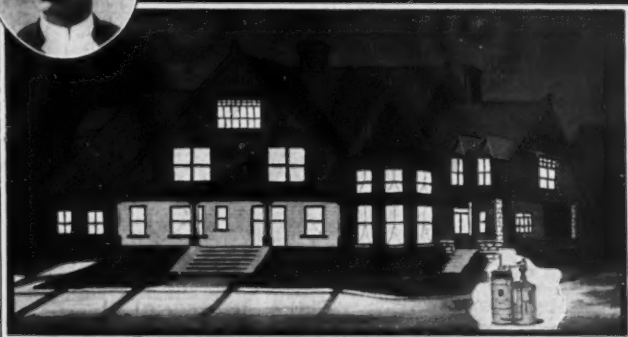
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THE CORNELL COUNTRYMAN is an Illustrated Monthly Magazine, published by students and graduates of the Cornell University College of Agriculture.

MANUSCRIPT for publication should be received by the 10th of the month preceding that in which it is to be published.

SUBSCRIPTIONS, \$1.00 per year, 10 cents per copy. At the expiration of each Subscription, notice and renewal blank will be enclosed. In order to insure renewal remittance should be made before the publication of next issue.

ADVERTISING RATES made known on application. We aim to advertise reliable firms only.

ADVERTISING COPY should reach us by 15th of month preceding issue.

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Entered as second-class matter at the post office at Ithaca, N. Y.

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THE STAFF OF THE ENTOMOLOGICAL DEPARTMENT OF CORNELL UNIVERSITY, 1906

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THE CORNELL COUNTRYMAN

VOL. 3.

APRIL, 1906

NO. 7

THE ENTOMOLOGICAL PROBLEM OF NEW ENGLAND

E. D. Sanderson.

Entomologist, New Hampshire Experiment Station

CALIFORNIA has its scale insects, Texas its boll weevil, the southern states the cattle tick and the Mississippi Valley the chinch bug; but in New England the chief entomological problem is the control of the gypsy and brown tail moths.

The spread of the gypsy moth since the unfortunate stoppage of the magnificent work of the state of Massachusetts in 1900, has been most remarkable. In 1905 it had spread over six times the area occupied in 1900, whereas in the previous ten years the gypsy moth commission had by their thorough work almost entirely prevented its spread and had reduced its numbers to a minimum within the infested area, in some places having absolutely exterminated it. Outside of an introduction into Providence, R. I., which seems to have been malicious, the gypsy moth has spread from Massachusetts into New Hampshire only, now occurring as far north as Portsmouth and infesting all the towns along New Hampshire's short coast line. This spread has undoubtedly been very largely due to the automobile which must therefore be considered as a new factor in the spread of insect pests. As is well known, the young gypsy moth caterpillars drop down from the trees by a strand of silk upon vehicles beneath, and are readily carried for considerable distances. In one case they were actually found on an automobile just south of Portsmouth, sixty miles from the point from which the auto had started. With the immense numbers of gypsy moth caterpillars swarming over the shade trees and woodlands in some sections of eastern Massachusetts, it is a wonder that the automobiles have not

spread them farther and unless they are materially reduced in these sections, it will be surprising if they are not carried to other states in the near future.

The gypsy moth caterpillars not only affect fruit and shade trees, but devour the pine and other conifers as well. They are therefore a much more serious enemy of our forest interests than the brown-tail moth which does not injure conifers. A single defoliation of a pine tree usually means its death and considerable areas of woodland in eastern Massachusetts have been killed by the gypsy moth caterpillars in a single season. It is therefore with considerable alarm that we have seen the pest enter New Hampshire, for the forest interests of New Hampshire are much greater than those of eastern Massachusetts; lumbering is one of our most important industries while the forests covering our hillsides and mountains are one of the most attractive features of the landscape which brings thousands of visitors and accompanying revenue to New Hampshire during the summer season.

The gypsy moth, however, spreads but slowly and with thorough work by well-trained men, its advancement can be almost entirely prevented. Though seemingly well able to fly, the females never use their wings, but crawl only a short distance before depositing their eggs. The eggs are laid on the bark of trees, occurring there from August until May and are easily seen by one with an eye trained to find them. It is therefore entirely possible by creosoting these eggs during the winter to hold the pest in check and this is the principal

means of fighting the gypsy moth. This work cannot be well done by the individual property owner, for where the egg clusters are but few he will not find them and usually he does not interest himself to hunt them up. It has therefore been found that the state can take charge of this work to much better advantage and that the only way to secure results is through trained men employed by or under the supervision of some state official.

The brown-tail moth curiously enough, was introduced into this country in almost the same locality as the gypsy moth, being imported on roses from Holland into Somerville, Mass., about 1890. The two insects are therefore very commonly confused in the mind of the public and by the newspapers although their habits and the combative measures are very dissimilar. The brown-tail moth caterpillars feed on both fruit and shade trees excepting conifers, but greatly prefer fruit trees and as yet have proven by no means as serious a forest pest as the gypsy moth, though they threaten to become so on deciduous trees. Injury by the brown-tail is not so serious, however, as the trees are defoliated earlier in the spring and are able to leaf out again before the hot weather of summer, whereas the defoliation by the gypsy moth is done later. The most objectionable feature of the brown-tail moth is the eruption produced by the little barbed hairs which thickly cover the tubercles of the full grown caterpillars. When the caterpillars molt, the cast skins are wafted around by the wind and where the caterpillars are abundant they swarm over everything so that these little netting hairs get into ones clothing and cause an irritation much like that produced by poison ivy. The nature of the trouble is not exactly known, the chemist of the gypsy moth commission having been unable to find any specific poison upon the hairs. The resulting eruption has a very similar appearance to that produced by poison ivy, and we understand has the property of reappearing when one previously affected becomes

over-heated, which would go to indicate that some specific poison is involved. Where the brown-tail caterpillars become abundant, therefore, it becomes an exceedingly disagreeable place to live. Rents go down and it is difficult to find a sale for property in a badly infested neighborhood. It is needless to say New Hampshire and other New England states having a large number of summer visitors are not anxious to see this pest become abundant.

Unfortunately the brown-tail moths are strong flyers and are carried by the winds when they emerge about the middle of June, often for fifty or seventy-five miles, as occurred in the summer of 1904 when they spread northward from the Massachusetts line to the southern edge of the White Mountains, and eastward to Eastport, Maine. It is therefore impossible to prevent their spread in any thorough going manner. The eggs of the brown-tail are laid on the foliage and hatch in August near the tips of the twigs. Early in September the young caterpillars web up the leaves into a winter web or nest in which they are snug for the winter, from three to a dozen of them further surrounding themselves with a thin wall of silk within the web, altogether some two or three hundred caterpillars occurring in each web. In this stage they pass the winter. The webs are easily seen and can be readily pruned from the trees and burned. It is therefore possible for every property owner as soon as he has seen a picture of the winter webs, to distinguish them and remove them from his trees. The work of combating the brown-tail moth therefore devolves upon the individual property owner and will ultimately consist in keeping the fruit and shade trees free from them, as it will probably be impossible to prevent their increase in forest and waste land. Here the property owner must be depended upon to control the pest, but if he will not do so he should be compelled to remove the nests by law, and the cost of removing them assessed against his

property as is now done in Massachusetts. At present we have no such law in New Hampshire but there is a strong public demand for it. The individual towns are making generous appropriations for the control of the pest and it has so far been more or less held in check, though worse in 1906 than in 1905.

At the present time the New England states are greatly interested in bills before congress introduced in the House by Hon. E. W. Roberts of Massachusetts and in the Senate by Senator J. H. Gallinger of New Hampshire, providing the secretary of agriculture with sufficient funds so that a quarantine against the gypsy moth in Massachusetts may be made and the national government may proceed to stamp out the pest outside the lines of this quarantine and prevent its future spread beyond such a line. The present conditions amply justify such a movement for the protection of the other New England states by the national government. Massachusetts has spent over one million and a half dollars in fighting this pest during the last fifteen years, which has during that time prevented its spread to other states. As the gypsy moth has now become so abundant in Massachusetts that it is a question whether with the present appropriations the state officials will be able to prevent its spread to other states, there would seem good reason for the national government protecting the other states from the pest as it has done in the case of animal diseases. There seems to be no good reason why the national government should not, were it feasible, as is clearly the case with the gypsy moth, to protect uninfested states from any serious insect pest, the same as it would protect them from disease. Had

this principle been recognized at the time the gypsy moth was first imported into Massachusetts it could undoubtedly have been stamped out as could the brown-tail moth and probably many other of our more serious imported insect pests. It is therefore with great satisfaction from an entomological standpoint that we view the present interest of the Bureau of Entomology of the U. S. Dept. of Agriculture in supporting these measures toward a quarantine of the gypsy moth now before congress. It seems probable that the measure will pass the House and we believe that there is a good chance for it becoming a law although it is questionable whether its passage will be secured in time for funds to be available for work this year. This has been the great difficulty in all work against these and other insect pests; that is, legislative appropriations have been made so late in the season that they have not been available for making the best use of them.

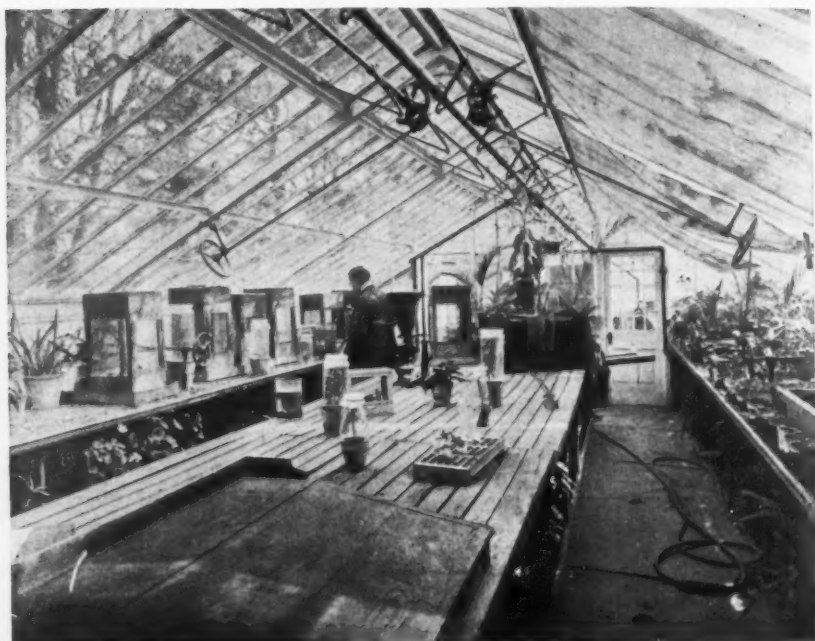
Should the national government attempt such a quarantine in New England it will be watched with interest by entomologists throughout the country as being the beginning of a policy upon the part of the national government in aiding and co-operating with the states in the control of insect pests, and one which we believe will be welcomed by all who have had to do with such work or who are interested to see the devastation of imported insect pests checked in every way possible.

[Professor Slingerland informs us that the gypsy moth has just been located at Stonington, Conn., and may appear in New York state at any time, if not already here.]—Ed.



SOME SAN JOSE SCALE NOTES*By Prof. M. V. Slingerland*

Assistant Professor of Economic Entomology at Cornell University



THE INSECTARY AT CORNELL UNIVERSITY
Professor Slingerland's Laboratory. Noted for Results

ABOUT 35 years ago there appeared in the vicinity of San Jose, California, a little insect which was destined in some ways to revolutionize fruit-growing in this country. It was a native of China, and nearly 20 years ago was unwittingly introduced into some Eastern nurseries. Its presence in the East, however, was not discovered until 1893, but it has spread with wonderful rapidity until it has gained a foothold in orchards in almost every State. It is being located almost every day in new localities, and thousands of acres of orchards have been and are being ruined by it in the East. A few progressive orchardists look upon its advent in the East as a blessing, and it certainly has brought about in many localities a much more thorough system of orcharding where the fruit-

grower becomes better acquainted with his trees.

Practically all fruit-growers now understand that the San Jose Scale has come to stay, and it will continue to be an important factor in fruit-growing in this country for many years. Probably it has not yet reached its maximum period of destruction, but the time will surely come when it will take its place with the other standard pests, like the codling-moth, plum curculio and others, and like them will have its "ups and downs." It is undoubtedly one of the most destructive insect pests with which our Eastern orchardists have had to deal, and its small size and the fact that each tiny scale must be thoroughly hit before it can be killed, makes it one of the most difficult pests to control.

More printers' ink has been spilled

about this insect, more time has been spent by experts in studying it, and more money has been spent by governmental authorities as well as fruit-growers in devising and testing methods for controlling it, than has ever been used against any insect pest of fruit trees.

Several insecticides have been thoroughly tested and found effective under certain conditions by some experimenters, while with others the same materials gave varying or uncertain results. In the early days of the warfare against this pest in the East, kerosene emulsion and the kerosene-water mixtures made with mechanical pumps sometimes gave good results. Then whale oil soap was largely used for a time, sometimes with good results except that often some fruit buds were killed. Crude petroleum soon came into prominence, and much effective work has been done with this material, and it is still used in some localities. It has to be used with care and judgment and should be used only on apple and pear trees. For a few years past the leading insecticide for the San Jose Scale has been the lime, salt and sulphur wash so extensively used for many years in California. It has been demonstrated that the salt is not a necessary ingredient, and various modifications of this wash, largely for the purpose of avoiding boiling it, have been devised and tested. This lime-sulphur wash has been more uniformly successful in the hands of experimenters and fruit-growers than any insecticide thus far used against this pest. Some failures have resulted from peculiar weather conditions, but more often the failure has been due to its not being thoroughly applied. It is generally conceded to be as effective and the safest of any of the materials thus far used against the San Jose Scale.

Recently several so-called soluble or miscible oils have been made and are now being thoroughly tested as insecticides for this pest. As they readily emulsify with water in almost any proportion and are much more agreeable to use and do not corrode

the pumps or clog the nozzles like the lime-sulphur wash, and best of all as most of the preliminary experiments indicate that they will kill a large percentage of the scales, fruit-growers are now looking to these soluble oils as a possible effective substitute for the lime-sulphur wash against the San Jose Scale. There certainly is no question about the killing qualities of these oils when they are thoroughly applied so that the scales are well soaked with them.

I believe the control of this destructive pest can be accomplished with our present insecticidal batteries, and that the secret of its control is largely in thoroughness of application of the insecticide. When fruit-growers clearly understand that each minute scale not larger than a pin's head must be literally soaked with the spray, its control by such orchardists can be accomplished. No half-way measures will ever prove effective in controlling this pest, and will simply be a waste of money and energy, and will surely result in the trees finally succumbing to the myriads of tiny pumps with which the scales suck out the life of the trees.

I think it is advisable to begin the warfare against this pest in the fall soon after the leaves drop, or even just before on badly infested trees, for it will do no harm if the leaves are injured, as they have done their duty toward the development of fruit buds for the next year. In the fall the insect is active in all stages on the tree, from mothers which are daily bringing forth their tender, living, young lice to those which are getting ready to go into hibernation as small, black scales not larger than a pin's head. Thus the insect is in its tenderest stages at this season. First prune off all the long, straggling branches and others that can be spared, then thoroughly drench the bark on all parts of the trees with a fine spray. I have killed from 90 to 95 per cent. of the scales at this time with one application of one of the soluble oils, using it at the rate of one part of the oil to 15 parts of water,

thus making a spray costing about 3 cents per gallon.

If the remaining 5 per cent. of the scales are allowed to go through the winter and begin their destructive work in the spring, they may easily bring forth progeny enough to infest the tree as badly as ever during the next summer, as one scale may be the mother of from one hundred to

five hundred young. Therefore, I would advise a second shot at the pest before growth begins, making the application just as thoroughly as possible, and try to reach the 98th or 99th scale in every hundred. While complete extermination is possible, I doubt if it can often be accomplished especially on large, rough-barked trees.



The Beginning of the Department of Entomology at Cornell University, 1875

MEETING OF THE EXPERIMENTERS' LEAGUE

Reported by E. L. D. Seymour and B. H. Crocheron

THE third annual meeting of the Agricultural Experimenters' League of New York was held in Stimson Hall, Cornell University on Feb. 21st and 22nd, 1906.

The first session was on Wednesday evening, Feb. 21st. President H. B. Winters made the opening remarks and introduced Dean L. H. Bailey who welcomed the members of the league to the university. Mr. F. A. Salisbury of Phelps, N. Y., Second Vice-President of the league responded to the address of Dean Bailey.

President Winters then introduced

Dr. W. H. Jordan, Director of the State Experiment Station, Geneva, N. Y., who spoke on "What Co-operative Experiments Imply."

Dr. Jordan drew attention to the dangers of co-operative experiments as a basis for the establishment of new data. The field for these experiments is in the application of facts already ascertained. The experiments carried on by the league should be for educational purposes rather than for the discovery of new truths which should be left to the Experiment Stations.

The next speaker was Professor W. J. Spillman of Washington, D. C., Director of the Division of Farm Management of the Department of Agriculture. Professor Spillman, in his speech on the "Principles of Heredity," said that we probably can change any characteristic of any plant but that it was very necessary to determine the rate at which a plant, improved by selection, will tend to deteriorate and revert to its original type. Professor Spillman explained the practical application of the Mendelian Law which he has worked out extensively with wheat and polled cattle. A number of charts were shown in connection with the demonstration of the Mendelian Law. The results obtained by Professor Spillman were quite remarkable and interesting both in breeding a variety of club winter wheat and in obtaining still more difficult results with Polled Herefords. Professor Spillman showed a profound knowledge of his subject and succeeded in arousing the interest of his large audience.

In opening the session Thursday morning, Professor Craig, Treasurer, appointed the Committee for Election to report in the afternoon. President Winters then introduced Mr. F. A. Salisbury who gave a report in the form of "Notes on Field Work." He called attention to the increasing success of legumes in this section and especially to the value of local experiments to the farmer. These he said would repay in actual results the time and labor expended. An interesting discussion followed. Professor Spillman, in answering one of the questions brought up for discussion, advised at any cost experimentation with the vetches. A disease of red clover now prevalent in the South is creeping North and will probably reach New York. In the event of this the vetch will prove invaluable as a substitute.

Professor U. P. Hedrick of Geneva, N. Y., Horticulturalist of the State Experiment Station read a paper on "Problems in American Pomology." Professor Hedrick emphasized the difficulty of the most important prob-

lems of pomology. Most prominent among these are a new horticultural classification and a better nomenclature, better knowledge of plant nutrition and breeding, the adaptation of plants to their environments, and a deeper study of plant pathology.

Professor Craig read a letter from Mr. H. Mason Knox of Canton, N. Y., in which Mr. Knox advocated a cow census of the state and a Farmers' column in local papers.

Professor H. H. Wing gave an address on the origin and present status of "Seven Day Milking Tests." He outlined the history and growth of the movement, the usefulness of which is to determine the economic lifetime production and standing of the cow for purposes of breeding and selection. Breeders of dairy cattle have been most prominent in making production the basis of selection. The origin of the present record system is found in the competition of the Jersey breeders which began about 1870. From this the present complicated system of records has been evolved. All records are now based solely upon the production of butter fat. The high records are in most cases the direct result of careful feeding. Seven day records are all forced records and to accept them as a statement of the average productivity is unsafe unless all conditions during that period are known. Professor Wing's paper gave a clear view of the present record system.

Professor W. J. Spillman, in an address on "Grasses," which was distinctive for the explicit and straightforward statements used, gave much practical advice to the farmer. He called attention to the fact that according to the census of 1903 about 90% of the hay in the country is timothy grown with redtop or other grasses. In an area in the northeast section of the United States the tame grasses of America are grown. Professor Spillman noted that in this section of tame grasses practically no literature about them has been published by the Experiment Stations there. The average yield of timothy hay is 1.1 tons per acre, for which low yield Profes-

sor Spillman finds no excuse except the laziness of the grower. Fields are in many cases left down for hay too long. Timothy and clover sod should not be kept for hay more than one or two years. They then may be kept in pasture one, two, or even three years.

Attention was called to the excellence of red top for pasture. A rotation was suggested for an average stock farm in New York as follows:

1st year—Corn in spring. At last cultivation put in clover or rye, or even mammoth clover as a cover crop.

2nd year—Plow under cover crop and plant corn for silage, potatoes, or sugar beets.

3rd year—Grain crop (oats, wheat or peas and oats).

4th year—Clover with timothy continued for several years.

The afternoon session opened with the report of the Election Committee. The officers nominated were as follows:

Honorary President....I. P. Roberts
President.....H. B. Winters
First Vice-president...U. P. Hedrick
Second Vice-president,

F. A. Salisbury

Director of Experiments, J. L. Stone
Secretary and Treasurer,

G. W. Hosford

This ballot was then voted upon and elected unanimously.

Professor John Craig, Secretary and Treasurer for 1905-6, then made his report for the previous year. In a brief review of the history of the league, he gave the credit of its foundation to the Winter Course Students of 1903. Professor Craig continued by saying that though the membership has not increased in the last three years, yet the interest in the league, together with its good results, is steadily gaining. He spoke hopefully concerning a report, which, if an appropriation bill can be carried, will probably be published before long. As treasurer he reported a balance of \$10.40 in the treasury.

President Winters next introduced Professor J. L. Stone, who gave an interesting report of his trip to the Ontario Experimental Union. The Union, he says, has grown surprising-

ly in its 27 years of existence, and now is of much importance in Canadian agricultural progress. During last year experiments were conducted on some 4,000 farms. Altogether the Union has performed and written up over 37,000 experiments, many of which have been published in the form of reports, by the Agricultural Department of Canada. As a result each section of the country has definite knowledge concerning the possibilities of its land, and is able to do much more satisfactory work. An interesting feature of the Union's methods has been the enlistment of the help of the former students of the Ontario Agricultural College. A regulation of railroad and hotel rates and other reductions have assisted the students materially in attending the annual meeting.

The next address was by Professor J. B. Norton of the Department of Plant Breeding at Washington, who gave an interesting account of the work of that department. His speech was accompanied by lantern slides which gave a clear idea of some of the methods and results of experiments being carried along on different lines, especially the improvement of plants by cross-breeding.

Dr. E. M. Santee of Cortland, N. Y., then gave his opinions and told of his experiences in connection with the use of muslin curtains as ventilators in poultry houses. Dr. Santee, who was one of the first to use this method of ventilation, has found it satisfactory in every respect, and even advises its use in dwelling houses. He explained that as the cloth effects the exchange of oxygen and carbonic acid gas, without dampness, it is the ideal ventilating material.

Professor J. E. Rice then gave a review of Poultry Experiments, in which he dwelt principally upon this question of cloth curtain ventilation. He has found that cloth curtains are highly satisfactory when used on poultry houses in conjunction with glass windows for the admission of sunlight. Though he found only a difference of one degree between the temperatures of houses with the curtains and without, (that with curtains

being the colder), the stock raised in the former was remarkable for its vigor and health, as compared with the low standard of the other flock.

Professor J. L. Stone next spoke, giving a report of the Field Experiments of the League. He said that in all, some 500 experiments were conducted by 400 people last year. After enumerating the various kinds of experiments and the numbers of those engaged in them, Professor Stone an-

nounced that, on the whole, the results of the work were excellent. While the Ontario Agricultural Union, referred to above, usually gets but 35% of satisfactory reports, our League receives about 50 %. All this work, though of some value to scientific agriculture, is of much more importance because of the information and general good gained by the farmer himself in performing the experiments.

THE 1906 SHORT COURSE CLUBS

By H. H. Harriman.

AS in former years the students of the Short Course have formed different clubs according to the different lines of work they were taking. Those students in general agriculture and horticulture have named their club *The Brill Club* after Mr. G. D. Brill one of their instructors. Many enthusiastic and profitable meetings have been held in the familiar old Trophy Room at Barnes Hall. Owing to the efficiency of its president, Mr. R. C. H. Fowler, the Dairy Club has had the best organization of any this year.

The class in Poultry was least in numbers but as active as the other two, and the members decided when a new arrival came to the home of their popular professor that he should furnish the club name, and so the James E. Rice, Jr., Poultry Club came into existence at the same time. The "Jimmie Junior" as it is familiarly called has held many lively debates, which showed in a striking manner the value of combining experience with theory.

All these clubs are combined into a federation called after our Dean "*The Bailey Club*," which has held several successful meetings. At one of these a warm debate between the Dairy and Poultry clubs took place. The debate was won by the Poultry club in spite of much smaller numbers. The Bailey Club has for its officers: H. W. Speares, president; W. E. Wright and R. C. Navins, first and second vice-presidents; H. H. Harriman, secretary, and Mrs. Bocker of Ithaca, treasurer.

The music furnished at the various meetings by the Mandolin club and quartette was greatly enjoyed. The former consisted of Miss Alice Simmons (a Senior) and Messrs. Boicourt and Knight, while the latter was composed of Messrs. A. Geffery, P. R. Steele, M. E. Roesch, and C. O. Reed.

On the evening of March 8th the Bailey Club gave a reception to the Agricultural College which was attended by 400 or more. The music was good and the stunts were very interesting and comical. One of the best stunts was a burlesque on the Poultry show which was presented by Messrs. Morrison, Morehouse, Hopper, Tyrell, White, Brigham and Harriman. Another very amusing stunt was a burlesque on a milk receiving station which wound up with some remarkably good clog dancing to the simple music of jewsharps, mouth-organs and bones. Those taking part were Messrs. Field, Wescott, Cuyle, dancers, and Blakeslee, Peabody, Burrows and Smith, musicians.

The Brill club furnished an interesting stunt which was followed by Miss M. Van Rensselaer, who read an original poem showing in a humorous light the many difficulties and duties of a Home Economics lady in her own home.

After this the program was concluded in the spacious rooms below where the ladies of the Home Economics Course served delightful refreshments, and after some time spent in social intercourse, farewells were said and the Short Course Entertainment for 1906 passed into history as a decided success.

THE MANUFACTURE OF CONDENSED MILK, IV

By O. F. Hunziker.

THE different stages through which milk passes in the process of the manufacture of sweetened condensed milk may be conveniently grouped under the following headings:

- a. Heating.
- b. Adding of cane sugar.
- c. Condensing.
- d. Finishing or 'stocking.'
- e. Cooling.
- f. Filling.

HEATING.

Milk to be made into sweetened condensed milk is heated for three main purposes: The first and all important one is that of destroying most, if not all of the active ferments (organized and unorganized), which are normally present in milk or which may have gained access to the milk accidentally on the farm, in transit, or at the factory. Secondly, the milk is heated in order to facilitate the dissolving of the cane sugar, which is added to it, and to insure a perfect solution. Thirdly, it is necessary in order to prevent the milk from burning on the steam jacket and steam coils in the vacuum pan or retort. The reduced pressure in the retort, causes the heated milk to boil as soon as it enters the pan. If cold milk were turned into the retort, it would stand undisturbed, and the introduction of steam into the jacket and coils would cause the milk to burn on to the heating surface.

From the weigh-room or receiving platform the milk is usually drawn into the vat-room. The equipment of this room consists of large vats which serve as reservoirs for the milk. Unless the condensing capacity of the factory is such that the milk can be condensed as fast as it arrives at the factory—which is rarely the case—the milk has to stand in these vats until the heaters are ready to take care of it. These vats should be provided with jackets or coils, through which cold water can be forced. This precaution is especially desirable in summer in order to keep the milk cool and

sweet. Under ordinary conditions the milk is not held thus more than from three to five hours. When the factory is crowded to its utmost capacity, however, as may be the case during May and June, or when, as the result of a break-down of a part of the machinery, or through some other accident, the condensing is delayed, so that the milk may have to stand in the vats all day, the wisdom of these precautions becomes obvious enough.

From the vat-room the milk is drawn into the well-room where it is heated, where the sugar is added, and the finished condensed milk is cooled. The name well-room, in all probability, originated from the fact that the kettles used for heating the milk and for adding the sugar are called hot wells and sugar wells respectively.

The heating may be done in more than one way, and different methods of heating are employed by different factories. The old way and the way which is still in use by the majority of condensories is as follows: Open copper kettles of a capacity of about 5,000 lbs. are used. The milk is heated in these kettles by turning live-steam into it until the desired temperature is reached. A rapid and uniform heating of the milk is facilitated by attaching a "steam rosette" (a brass cylinder from six to eight inches in diameter perforated with innumerable fine holes) to the lower end of the steam pipe reaching to within from 12 to 18 inches of the bottom of the copper kettles. It is customary to heat the milk to a temperature of 180° F. to 190° F. A thermometer with a long stem inclosed in a brass casing is used for determining the temperature. This is a simple, and, indeed, a primitive way of heating the milk and it has its decided disadvantages. From the point of view of economy it is a waste of fuel. By the time enough steam has passed into the milk to heat it to the required temperature, enough condensation water has been added to the

milk to swell its bulk from 1-10 to 1-6 of the original volume of milk. Naturally, the wetter the steam the greater the amount of water that is added to the milk. All of this water must be evaporated from the milk again; and this means more time for condensing and much extra fuel. Aside from this extra expense in condensing, the direct access of live steam to the milk is of no benefit to its quality, and, where unclean and filthy water is used in the boilers, as is often the case, undesirable taints and odors may be incorporated in the milk. These facts seem to be entirely disregarded by many of our condensed milk companies. Superintendents of some of the old established concerns, who have been raised on condensed milk, who worked in the condensory from the time they left the school and who spent the best part of their lives in the condensed milk business, when asked why they are still heating their milk with live steam, are prone to tell the questioner that the introduction of live steam effects a "perfect emulsion" in the milk. Just what condition this refers to the writer is at a loss to say. If it means that the introduction of live steam into the milk will homogenize milk or change its physical condition so that the fat globules have lost their power to separate out again in form of cream, the statement is incorrect. Milk heated with live steam will cream as easily as milk heated in any other way. If it does not mean the above, then, in all probability, the term "perfect emulsion" as used above, does not mean anything.

To rapidly heat large volumes of milk to a temperature above 180° F. without burning the milk and without the use of live steam is a problem which has puzzled and which is still puzzling many a condensed milk man. Pasteurizers of all kinds and sizes have been devised but the temperatures to which they are able to rapidly heat large volumes of milk is generally below that to which milk must be heated in the condensory. Careful experiments have shown that

a temperature of 76° C. or 180° F. is the lowest temperature at which it is safe to heat milk which is subsequently to be made into sweetened condensed milk. Where too low temperatures are used the sweetened condensed milk usually acquires a stale taste, within a comparatively short time after its manufacture and later tends to become putrid.

The simplest way to heat milk then would seem to be in a kettle with a steam jacket. This was found impracticable, because the cold milk that comes in contact with the hot jacket burns on to the heating surface when steam is turned into the jacket. All attempts to prevent the burning of the milk by the use of stirring devices have so far proved unsuccessful. But large volumes of milk can be heated to the boiling point without burning, where the milk entering the jacketed kettle has been previously heated to a temperature of say 160 to 170° F. For this reason it is of advantage to use two heaters; one a continuous pasteurizer of good capacity, preferably of the "Miller-type," and the other a copper kettle with a steam jacket. The milk runs first through the continuous heater and from there into the kettle. The kettle should be so constructed that when the milk begins to rise in it, it will overflow into the sugar tank or sugar well.

ADDING THE SUGAR.

The sugar is added to, and mixed with the milk in various ways. In some factories it is added to, and dissolved in, only a small portion of the milk and in a separate tank, while the rest of the milk is drawn into a so-called ground well—a tank sunk into the floor of the well-room—from where it is drawn into the retort. Where this is done the sugar well is usually fitted with a reversible mechanical stirrer, revolving to and fro on an eccentric, thus stirring the milk and sugar thoroughly. In other factories the sugar well and ground well are one and the same tank. Where this is the case it is a good plan to set a wire mesh strainer (60 to 80 mesh

per inch) over the sugar well, transfer the sugar into this strainer, little at a time and let the hot milk run through the strainer, dissolving the sugar as it passes through. By stirring up the sugar in the strainer occasionally with a paddle, it will dissolve more readily. To save labor the sugar barrel and scales are placed on the floor above the well-room and the sugar is transferred through a chute with an adjustable "shut-off" into the strainer or sugar-well below. The manner of adding the sugar is unimportant. The main point is to use nothing but the best refined, granulated cane sugar and to avoid any undissolved sugar from being drawn up into the vacuum pan. The sugar must be in complete solution before it reaches the pan. The amount of sugar used varies in different countries and in different factories in this country. The usual ratio is 15 or 16 lbs. of cane sugar per 100 lbs. of milk. Some companies use only 12 lbs. while others use 19 lbs. of sugar. The price of sugar naturally has a tendency to regulate the amount of sugar used. Thus in summer when milk is cheap and the price of sugar is high the manufacturer is tempted to reduce the per cent of sugar in condensed milk. There are certain maximum and minimum limits, however, which should not be overstepped. Condensed milk is used as a substitute for crude milk. The more cane sugar it contains, the greater is the difference between the composition of condensed milk and that of crude milk, and a great excess of sugar in condensed milk certainly does not add to its wholesomeness as a food. On the other hand, cane sugar is added to the milk for the purpose of preserving it. Sweetened condensed milk is not sterile, and is prevented only from rapidly undergoing fermentative changes by the preservative action of

the sugar. Therefore, the less sugar it contains the greater the danger of its spoiling.

Nothing but the best refined granulated cane sugar should be used. When buying sugar the manufacturers should bear in mind that the best is the cheapest. When the price of sugar is abnormally high the manufacturer is strongly tempted to buy a lower grade of sugar. Experience has amply shown that this policy is poor economy. Cane sugar of inferior quality is one of the most dangerous enemies of the condensed milk business, as such sugar lacks the preservative power of good sugar and may in itself be the source of ferments which lessen the keeping quality of sweetened condensed milk and hasten its decomposition. The effect of inferior sugar in the milk usually is not noticeable for from two to four weeks. This fact makes its use all the more dangerous and increases the losses therefrom, as the manufacturer will have processed the milk of perhaps 30 days before he knows that its quality is defective.

Great care should also be taken in storing the sugar at the factory. It should be kept perfectly dry; when exposed to dampness it is apt to become lumpy, moldy, and sometimes sour. Sugar conveyors such as sugar-chutes through which the sugar passes down into the milk should be kept dry and clean. Where the sugar-chute is placed directly over the sugar well, the vapors from the boiling milk below may cause the remnants of sugar to crust on the inside of the chute. This moist crust when contaminated with bacteria or yeast may start to ferment, and, when carried into the milk with the other sugar, will give rise to gaseous fermentations, causing the milk to "blow."

(To be Continued)

THE SIXTH ANNUAL BANQUET OF THE COLLEGE OF AGRICULTURE

Reported by B. H. Crocheron, Sp.

We are all glad that the College of Agriculture is noted for its spirit and enthusiasm; but, when, at some general gathering, we all shout together for our college and for agriculture, the enthusiasm exceeds our expectations. This loyalty is shown in the class rooms, on the campus, and most especially at the monthly assemblies. The one time in the year, however, when enthusiasm runs riot, when the college spirit stands forth in the most striking way, is at the Annual Banquet.

Washington preferred agriculture above all else and it is, therefore, particularly fitting that here his birthday should be celebrated by the annual banquet of the college. During several days the State Experimenters' League had been in session. Their meetings closed with this banquet so that many members of the league were present.

At eight o'clock 398 persons sat down to the banquet. The Armory was rendered beautiful for the occasion, for the decorators had been busy and had covered the walls with drapery of Cornell colors and national flags. The tables arranged like a fan radiated from a centre where the toastmaster and speakers sat. Candles glittered down the tables amid the flowers and decorative plants. The menu books contained a picture of the new buildings of the college, the menu for the evening, the list of speakers, and two pages for autographs.

The dinner was served with a promptness which reflected credit upon the caterer and those who had arranged the details. One of the most enjoyable features of the occasion was the abundance of music. The new Agricultural Glee Club, was seated at a table to the right of the speakers. The banquet was opened by the singing of "Alma Mater," led by the glee club, which was quickly followed by the "Alumni Song" in

honor of the many alumni present. One popular song followed another in quick succession in all of which the diners joined. The Agricultural Mandolin Club at a table to the left of the speakers played at intervals during the dinner. The only music furnished by those not in the college was that which the Filipino String Quintette rendered with such great success. The thanks of the college are tendered the Quintette.

The toastmaster of the occasion was Charles W. Mann, '06, who performed his task greatly to the satisfaction of every one present. Mr. Mann extended a hearty welcome on behalf of the students to all the visitors present, friends, alumni and members of the State Experimenters' League. He emphasized the fact that this was the one occasion upon which the whole college body came together upon an equal footing for an annual celebration.

President Schurman was the first speaker. The short yell for "Prexy" rang out with a sharpness and volume that showed that the College of Agriculture has strong lungs and knows just when to use them.

President Schurman said that the banquet impressed him more as a large gathering of friends than as a purely public and formal affair; that the College of Agriculture was so knit together that faculty and students were friends. He quoted in that connection the definition of a friend by a small boy: "A friend is one who knows all about you but likes you just the same." President Schurman commented upon the large number of students in the Short Course present. He said that the Short Course was growing and that he appreciated that it would continue to grow as it was through the Short Course that the College of Agriculture touched the farmers of the state in perhaps the most direct way.

When agreeing in some cases with the old proverb that "a little knowledge is a dangerous thing," President Schurman said this was not true in agriculture, that the Winter Course students took the knowledge that they had received here and in a short time put it to test on the farms of the state.

A little knowledge is not a dangerous thing when substantiated by practice.

In introducing Dean Bailey, Mr. Mann said that although we had in the length of a four year course many opportunities to hear Dean Bailey that we realized that his life was an unusually busy one and that we appre-



The Experiment Station Insectary at Cornell. Familiar to many Entomologists

ciated the fact that the Dean so often took time to talk to the students.

Dean Bailey, who spoke on "The Outlook to Education," said that the members of the Chinese Commission who had recently visited Cornell remarked that the most impressive thing about the University was the Cornell yell. It was the loyalty of the students that had impressed the visitors. The Director wished to remind the students that they, in going out from Cornell, must go out to serve their day and generation as well as to be farmers. He said that the agricultural colleges themselves touch more nearly all branches of life because they are brought to face and to meet actual conditions and not theoretical

facts. Because this is true the college has much to teach. The time has come when the short course, successful as it is, should be supplemented by an elementary course in agriculture in the elementary schools. That the winter course should not have to teach the fundamentals of agriculture but rather to act as a postgraduate course of the agriculture taught in the primary schools. To the winter-course students Dean Bailey said that they must not be satisfied with what they had learned here in a few months but should go home and tell all those interested that they should have a four year course. Dean Bailey concluded by saying that we are now in a state of transition in the College of

Agriculture and that in a way it is good to have it so that there is pleasure in work and in accomplishment and that it is a joy to be in the thick of it.

Miss Snowdon was next introduced by the toastmaster and asked to respond to the toast "The Girls."

Miss Snowdon in a short address told how the girls were coming to take agriculture in increasing numbers and how they were going to be more of a factor in the life of the college. The college is becoming more and more crowded and more room will have to be made for women here at Cornell.

The next speaker was Professor Hunt who spoke on "The Agricultural Student." He said he must be pardoned if he emphasized the noun more than the adjective and talked more of students as men than agriculture as a business for he felt that it was of greater importance to be an educated man than an educated butter-maker. Professor Hunt made the statement that the loyalty of the students to the college of agriculture was greater here than he had seen anywhere else and that it was because of this loyalty of which he knew, that he appealed to them to crush out all tendencies in the college, to keep their habits clean, and to discourage the type of man who would go away from the college a connoisseur in bull pups, cigarettes and sofa cushions. He emphasized the difference between mental intellectuality and mental dyspepsia and stated that the former could not be obtained except through clean life and sober habits.

The toastmaster said that during a course of four years the student saw much of his college and obtained a different point of view from the man who was here for the winter or even two years; that Mr. Ross could perhaps tell us more of interest about the college than any other undergraduate. He introduced Harold E. Ross, '06, who spoke on "Our College."

Mr. Ross said that the time was soon coming when our college would be too large for one man to talk about,

that on the campus, and among the students the college of agriculture had gained the respect and admiration of the whole university. In closing he called for a toast "to the greatest and best Alma Mater a man can have," "Our College."

On introducing Professor Craig, Mr. Mann explained that Professor Craig was not only a horticulturist but also a farmer. That this evening he would depart from his usual subject and talk on "The Farm."

Professor Craig mentioned the large predominance in the college of men from the farm. He commended them in their attitude toward the women in the college. He said that he regarded the correct attitude in co-education as being here reached where the women are treated with a certain degree of independence and yet a large amount of chivalry. Professor Craig emphasized his remarks with many interesting and instructive stories which he knows so well how to tell.

Mr. H. H. Herriman spoke on "The Short-Course." Mr. Herriman, who was also here last year, is an enthusiast upon his subject. He spoke of the value of the courses here and showed that in order to obtain the best results from them the men must go home prepared to find the girl who is somewhere waiting for each one of them and settle down with her to a useful life.

Mr. H. Mason Knox, '01, who was to have been the next speaker was unfortunately prevented by illness from being present.

Mr. Harry B. Winters, President of the State Experimenters' League, kindly consented to talk on the subject selected by Mr. Knox, "Reaching the Farmer." Mr. Winters said there was no necessity of telling Cornell University how to reach the farmer as it was already doing so in a way which could hardly be bettered. Mr. Winters illustrated his remarks by several anecdotes from personal experiences.

The program was closed by all singing the evening song led by the glee club.

The Cornell Countryman

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APRIL, 1906

Next Year's Board

WE take pleasure in announcing that the election of the *Cornell Countryman* Board for 1906-7

has taken place. The new board consists as follows:

Charles H. Tuck, editor in chief; Milton P. Jones, business manager; B. H. Crocheron, alumni editor. Other associate editors are as follows: Miss P. B. Fletcher (general agricultural news), H. F. Prince (campus news), C. J. Hunn, E. L. Baker, E. L. D. Seymour. Assistant business managers are H. C. Pierce and E. McCloskey.

Not all the places on the business side are filled as yet. The Constitution allows the election of as many men as necessary to properly run the paper. Two more men could be used to advantage on the business side and if the competition warrants, it is probable that these places will be filled before the end of the present year.

The old board wishes to congratulate the new, and assure its members of our best wishes for a prosperous year and the biggest, best, most dignified and substantial *Cornell Countryman* ever published. *The Countryman* or any other similar enterprise cannot live without growing, and we

have every confidence that the new board will not only stimulate an active growth, but will guide that growth in the right direction.

The Countryman Board Banquet

ON the evening of the 9th of March, the *Cornell Countryman* board held its annual banquet.

There were present as guests, Dean and Mrs. Bailey, Mr. H. W. Collingwood, editor of the *Rural New Yorker*, and Mr. C. S. Wilson, a former editor of *The Countryman*.

After spending some time with that part of the program which was embraced by the menu, attention was turned to a frank discussion of how *The Countryman* might be bettered in the future. Much kindly advice and friendly criticism was given by Mr. Collingwood, and the compliments he paid the paper were very encouraging to those who have labored on the board this year. Some there were who thought that the general run of the articles had been too long; others thought that more illustrations should be used; and still others thought that one or two pages of every issue should be given to the State Experimenters' League for the publishing of their experiments. This discussion proved very valuable and the editors wish to state that they invite friendly criticism at all times from anyone whether they are connected with the paper or not. Let the board know what you think of the paper, for how can we put out a paper that suits you if you have never told us what you like.

It leaked out at the banquet that Dean Bailey and Mr. Collingwood attended the Michigan Agricultural College at the same time, and that Bailey as editor and Collingwood as business manager organized and pub-

lished the first agricultural college student paper in the United States. Small wonder, then, that these men have grown into such giants in the publishing world. As a matter of fact, the advice born of such ripe experience, which they so freely gave to the members of the board at this banquet, was greatly appreciated and enjoyed, for it will always be a great help to them in their work.

It is with great pleasure that we announce that **Good Precedent Established** Mr. Harrison L. Beatty of Bainbridge, Chenango County, New York, has established a scholarship in the Winter Course amounting to \$75.00 annually. This scholarship is open to any resident of the town of Bainbridge, the person to be chosen by competition.

We thus have a precedent established which we hope will be widely followed. If we are not mistaken this is the first instance of an Agricultural Scholarship being endowed by a private individual in the United States. Mr. Beatty has served the cause of agricultural education well by his action and he deserves the credit of having established a precedent which other benefactors may well copy after.

GENERAL AGRICULTURAL NEWS

SYRACUSE, N. Y.

The Cornell Countryman:

DEAR SIR:—Thus far the season in this section has been altogether wrong, not that any seriously ill effects are noticeable but the lack of snow, the mild temperature generally and the bright sky make it seem unreal and out of place. A moderate mantle of snow over the ground would have better protected the fields and crops and would have made it

quite as easy and pleasant for the average farmer or dairyman, and the merchants would have had a good chance to dispose of their winter goods which now they will have to hold over or dispose of at a sacrifice.

This section is getting to be a center for highly-bred, registered Holstein-Friesian cattle and we are continually acquiring a larger number of breeders and they in turn seem to inspire others to at least investigate, and as a consequence the sales have been splendid and some of the more progressive breeders have added to the wealth and glory of their cattle and the breed by making a large number of "official records," most of which are a decided credit to the herds and the breed. At Lakeland Farm, over whose destinies I preside, we test each and every cow and heifer as she freshens and can be gotten into shape to make a test. The results thus far, have been most flattering and Mr. John W. Evans, the supervisor of the tests, who is a Cornellian, is to be congratulated in having been so fortunate as to have cast his lines in such a well filled stream. For during the two months of his stay no less than fifteen official records have been made and most of them are highly creditable.

Yours truly,

WING R. SMITH.

* * *

West Virginia is considering moving its Agricultural College at Morgantown away from the University and locating it on a large farm, or separating it from the university without changing the location. West Virginia is having the same trouble that other colleges have had where the State appropriated funds ostensibly for the aid of agriculture, but which in reality, went to support the "mechanic arts" and the former was left to struggle along with little or no equipment.

In the arguments brought forward it is said that the agricultural colleges doing the best work are those which are located by themselves and have complete supervision of the funds. It

is a recognized fact that good agricultural colleges can and do exist connected with a university. Cornell stands pre-eminent in this class.

In any case whether connected with the mechanic arts, or without, the college should have complete control of appropriations, which should be liberal. If not allowed this right, the failure of the agricultural college to be of the greatest benefit to the state is not due to the motive, but to the method.

* * *

A committee has been appointed by the Minister of Agriculture of France to investigate the inadequacy of the French system of agricultural research as compared with similar institutions in Austria, Germany and United States.

* * *

Requests for information have been pouring in to the various experiment stations of late, concerning the reliability of artificial cultures for the inoculation of the soil in fields intended for leguminous crops. A few trials have been successful but many more have failed completely.

A recent bulletin from the N. Y. Experiment Station at Geneva explains a majority of the failures. The non-success has not been due to the idea that it is impossible to inoculate soil with bacteria for legumes, but to the fact that the cultures have been put up in an improper manner.

The bacteria cultures were procured in the open market from prominent seed firms. Bacteria were immersed in cotton, then the cotton was dried and in this condition was ready for commercial uses.

The treatment given the samples under experiment were far more careful than the average farmer could give them. Distilled water, sterile instruments and the best quality of culture media were used. At first great care was taken that no other bacteria entered the culture media; but the negative results suggested that the distilled water might have affected the growth of the bacteria. Then rain

water was used with no better results.

Thinking possibly that something was wrong at the station, packages were sent to bacteriologists and experiment stations in Michigan, New Jersey and Delaware. When the reports from these places were received and were found to tally with those at Geneva, there could only be one conclusion—something was radically wrong with the culture when placed on the market. In many cases bacteria taken from alfalfa, clover and bean plants thrived in the same media as those in which the artificial cultures had been placed and failed.

The tests showed that the artificial cultures deteriorate very rapidly. The colonies of bacteria, when the right kind were found, were few in number and lacked strength and vigor. In too many cases none of the desirable bacteria were present.

The price paid for these cultures is out of bounds when the cost of production and value to the farmer are considered. They sell for two dollars a package while the cost to the manufacturer is less than ten cents. One package is considered sufficient to treat an acre of land.

Until a more efficient method of preparing them is evolved, the farmer is wise in not taking chances in buying these cultures.

* * *

It seems strange that in an agricultural state a great united effort must be made to get an appropriation from the legislature to put its agricultural college on a fair working basis. Virginia is now making such an effort. A bill is before the Assembly to appropriate \$50,000 to complete the agricultural building, \$25,000 to equip it, and \$10,000 a year to maintain it. For a small amount like this, which is most reasonable, the farmers are compelled to exert all possible influence upon the legislators, and even then they hesitate.

The legislature is acting like a farmer who continually expects an abundant crop from his farm and yet returns nothing to it. If the legislature

of Virginia lacks confidence in its agricultural college and will not make a reasonable appropriation to maintain it, they should not expect great agricultural prosperity in their state.

There is little chance of Virginia securing immigrants and of solving the labor problem until she does something to make the farms and the farm boys prosperous.

* * *

In a previous editorial of the *Cornell Countryman* (Dec. 1905), was briefly pointed out the value of the Grange to the agricultural student.

Many students in the College of Agriculture are members of this order. Many have joined during the past year, a large proportion of those being Winter-Course students, but also including a number of the Faculty.

There are excellent facilities for active Grange work at the University, the local Grange being in a thriving condition, with numerous other strong Granges scattered throughout the county.

On Dec. 16, 1905, an open meeting was held, all students in the College of Agriculture being invited; and through this meeting much was accomplished towards bringing the Grange and the college into closer touch. Dean Bailey gave a very interesting address on "Farm Management."

The Winter-Course men have been closely in touch with the local Grange during their brief stay. To them must be given much credit for the enthu-

siasm of the meetings. Members of the Faculty have given suggestive and practical talks upon various pertinent agricultural subjects, but the students themselves have largely aided in making these meetings a success.

Several informal meetings have been held at the homes of prominent farmers, in which both the farmers and the students took part, the practical experience of the one confirming the principles of the other, and principles elucidating experience.

On March 17th, just before the departure of the Winter-Course students, a banquet was given in honor of the new members. Interesting talks were given by Prof. Wing and Prof. Rice, representing the Faculty of the college; J. E. Chenoweth, representing the Winter-Course students; and Mrs. Marshall, representing the farmers and their wives. This pleasant evening will be long remembered by the Winter-Course Grangers as their last and best meeting at Cornell. The Grange, in turn, will not quickly forget these earnest young men, and has wished them all true success.

Sp. '04—Glendy Farnsworth died at Cambridge, Mass., Jan. 23. Mr. Farnsworth went to Arizona after leaving college. Not liking the West he came East and took a position in Cambridge. While there he was operated upon for appendicitis, which after a short illness resulted in his death.

CORNELL NEWS

CAMPUS NOTES

The class in Poultry Husbandry on March second and third visited Waterville and Greene, N. Y. While at Waterville they were the guests of the "White Leghorn Poultry Yards" and the "Columbia School of Poultry Culture." On the evening of the second the class attended a banquet at the Pickwick Club. After the banquet a

number of informal speeches were made by those in charge of the work. Prof. Rice responded on behalf of the class.

* * *

The following non-resident lecturers have been giving instruction in the poultry course: Prof. W. R. Graham of Guelph, Canada, on "Crate Fattening Chickens;" Prof. J. H. Stoneburn of the Columbia School of

Poultry Culture, Waterville, N. Y., on "Brooders and Brooder Houses," and "Poultry Advertising;" Mrs. Geo. E. Monroe of Dryden, N. Y., on "Poultry Keeping for Women."

* * *

Dean Bailey attended the annual banquet and "round up" of the State Institute workers at Syracuse March 15. On the following day he appeared before the State Normal School at Jamaica, Long Island, and delivered a lecture on "Nature Study." On March 17, he spoke before the New York Educational Council of New York City.

* * *

L. R. Tufts, sp. '05, left March 10, for Brighton, Island of Trinidad, to take charge of the farm of the New Trinidad Lake Asphalt Co. Especial attention will be given to developing the tropical fruits.

Messrs. Ora Lee, Charles Mann, Walter Tailby, Harvey Westover, all '06, and Edmund Worthen, grad., have recently been appointed as scientific assistants in the Bureau of Soils, Washington, D. C.

* * *

The Jas. E. Rice Jr., Winter Poultry Club has adopted a class pin. It is in the shape of a white egg, inlaid with a red feather and a gold wish-bone, with the words inlaid in gold, "Cornell 1906."

* * *

A number of the winter course poultry students have already received positions. Among them are, W. T. Knight in charge of the Whitehaven Sanitarium, Whitehaven, Pa.; W. G. Krum, superintendent of the farm of Floyd L. Carlisle of Watertown, N. Y.; E. Shevalier at the Robin's Nest Poultry Farm, L. A. Ripley winter course, '05, Mgr., Litchfield, Conn. P. K. White, Pencoyd Farm, Chas. H. Royce '91, supt., Balla, N. Y.; J. B. Soule in charge of Cragmore Inn, at Cragmore, N. Y.; W. S. Lyon, in charge of the poultry farm of H. A. J. Upham, Kilbourn, Wis.

Bulletin 237, "Reports of Alfalfa," by J. L. Stone, John W. Gilmore and Samuel Fraser will soon be in print. It gives complete and concise information on the conditions necessary for success, soil inoculation, fertilizers, nurse crops, etc.

* * *

Eighteen students in the College of Agriculture have received positions since June, commanding salaries from \$800 to \$3,500.

* * *

So far two lectures have been given before the College in the Course of Agricultural Journalism. The first was delivered on March 9th by Mr. H. W. Collingwood, editor of the *Rural New Yorker*, and the second on March 14th, by Gilbert M. Tucker, editor of the *Country Gentleman*.

* * *

L. F. Boyle will have charge of E. G. Wyckoff's poultry plant at Cornell Heights, Ithaca, N. Y.

* * *

C. Tyrell returns to his former place at Lake George in charge of G. F. Peabody's poultry plant.

* * *

The Dairy Department has received from John H. Munrad, associate editor of the *New York Produce and Creamery Review*, an excellent framed lithograph portrait of Prof. N. J. Ford, a noted pioneer teacher in Dairying in Denmark. The picture will be hung in the new Dairy Building of the Cornell College of Agriculture.

FORMER STUDENTS

'74, B. S. A.—John Henry Comstock was born in Janesville, Wis., Feb. 24, 1849. The following year his mother was left a widow and came east with her son. At the age of ten Prof. Comstock began to take care of himself, working all of his spare moments in return for winter schooling. Five years later, by the advice of one of his teachers, he began preparing

himself for a higher position in life. During the summers he worked aboard sailing vessels on the Great Lakes, and between seasons, he attended, first the academy at Mexico, N. Y., and the two years following, the Falley Seminary at Fulton, N. Y. Here he began the study of botany and continued this subject during the summer. While in search for a certain text-book of botany, he chanced upon a copy of Flint's edition of "Harris' Insects Injurious to Vegetation," printed with



J. H. COMSTOCK, '74

colored plates. As soon as he became aware that there was such a science as entomology, he determined to devote his life to that work.

Upon learning that Cornell was to establish a chair of entomology, Prof. Comstock, spurred on by his desire for further entomological study, entered the class of 1874 with which he graduated. During his college years, he was entirely self-supporting, acting as an assistant chime master, janitor, and even as a laborer upon the buildings in which he now lectures to classes in entomology. Largely through the influence of Dr. Wilder, a department of entomology was organized with Prof.

Comstock at its head. In the fall of 1876, he was promoted to the rank of assistant professor. In 1879, he received the appointment of U. S. Entomologist, which position he held for three years, making a world-wide reputation. After resigning, he returned to Cornell as Professor of Entomology and General Invertebrate Zoology, which position he still holds.

In 1878, Prof. Comstock was married to Miss Anna Botsford, of Otto, N. Y., Cornell, A. B., '78. In his wife he found an efficient co-laborer in his scientific work because of her artistic and technical skill in both drawing and wood engraving.

Prof. Comstock's main publications are: The Reports of U. S. Entomologist, 1879, 1880 and 1881. The reports of '80 and '81 deal with the classification of Coccidae, for through his investigations, that classification was put on a firm foundation. This study was continued in the 2nd report of the Department of Entomology of Cornell University Experiment Station. He published in 1882, "The Elements of Insect Anatomy," followed in 1888 by a text-book, "An Introduction to Entomology," and the "Evolution of Taxonomy," in 1893. Together with his wife, he published in 1895, the "Manual for the Study of Insects;" in 1897, "Insect Life," and in 1904, "How to Know Butterflies." His works upon economic entomology are recognized as standards and in systematic entomology he has had an equally enviable reputation. In addition to his strictly entomological work, he is now preparing "A Manual of North American Spiders."

'77. B. S.—Leland Ossian Howard. Among the Cornell men who are carrying the world's work with energy and success, Dr. Howard is a notable example. He was elected to the board of trustees of Cornell University for five years in 1900. The consistent advancement of Dr. Howard in his scientific career is well shown in the biographical sketch which follows:

Although born in Rockford, Ill., his parents moved to Ithaca, N. Y.,

in 1858, when he was about a year old. He prepared for college in the Ithaca schools and entered Cornell in the fall of 1873. After graduating he took a year of post graduate work in the University preparatory to medicine. From his childhood, however, he had evinced the greatest interest in natural history, and during his University course had made a specialty of entomology. In Nov., 1878, he was appointed assistant entomologist under Prof. C. V. Riley in the Department of Agriculture at Washington, D. C.,



L. O. HOWARD. '77

In 1882, he took the degree of M. S. at Cornell. In 1894, he was promoted to Chief of the division of Entomology, and his department was made a government bureau in 1904, co-ordinate with those of Plant Industry, Animal Industry, etc. He has been a conspicuous figure in scientific circles in Washington and has served both as president of the Entomological Society and Biological Society of that city.

In 1897, he was made permanent secretary of the American Association for the Advancement of Science, which office he still holds. This is the

largest organization of scientific men in America, and the office of permanent secretary involves the major part of the administration work of that society.

A noticeable feature of Dr. Howard's work has been the solving of economic problems. He started the crusade against mosquitoes and is still the authority on mosquitoes. He is the author of a great number of bulletins and government reports on entomological subjects in their relation to agriculture, has contributed to the popular magazines and has published two books which have been widely read: "The Insect Book," and "Mosquitoes and How They Live." He is consulting entomologist of the U. S. Public Health and Marine Hospital Service, and in this connection has been intimately connected with the fight against the yellow fever mosquitoes.

His excellent work has brought him numerous honors from foreign countries as well as in this country.

Dr. Howard has at all times manifested a keen interest in his Alma Mater, and few alumni are better known to its faculty and board of trustees.

'86, B. S.—Prof. H. E. Summers, after holding the fellowship in Agriculture during the years 1886-1888, occupied the position of associate professor of biology at the Agricultural College of Tennessee from 1888 to 1891. He then served as assistant professor in the Illinois State Laboratory of Natural History until 1893, at which time he was appointed associate professor of physiology in the Univ. of Illinois. In the year 1898, Prof. Summers accepted the chair of Zoology at the Iowa State College where he is at present. At this time he was appointed State Entomologist of Iowa. During the college year Prof. Summers spends most of his time in teaching, and nursery inspection. His chief scientific work has been the study of *Heteroptera*.

'88, B. S.—Prof. J. M. Stedman, was an instructor in entomology and invertebrate zoology at Cornell in

'88-'89. He accepted the position of professor of biology in Trinity (N. C.) College in 1891. From here he went to the Experiment Station, Alabama Polytechnic Institute. Prof. Stedman became professor of entomology at the Missouri Agricultural College and State Entomologist in 1895, which position he now holds. He has made a special study of economic entomology and general biology, having made a special study of the tape worms of sheep.

'89, B. S.—F. H. Chittenden. Since leaving Cornell, Dr. Chittenden has devoted his time to purely entomological investigations. At first, he was an editor of "Entomologica Americana" published in Brooklyn, N. Y. In 1891, he was appointed as an Assistant entomologist of the U. S. Dept. of Agriculture. Here his work has been varied, consisting of editorial work which soon developed into investigations of injurious insects. Now he is entomologist in charge of Breeding Experiments. It has been stated that up to the present time Dr. Chittenden has written about 200 articles on entomological subjects. About two years ago he received the honorary degree of Doctor of Science from the Western University of Pennsylvania. His chief publication is a pamphlet entitled, "Some Insects Injurious to Stored Grain."

'89, B. S.; '90, M. S.—Nathan Banks, Washington, D. C., March 7th, 1906. "Where am I? Right here, at the centre of the universe. What am I doing? Reducing the government surplus. My prospects? Brilliant and alluring. My successes? Minus (numerous). Am married; with four children; no race suicide. I am a "countryman,"—a vine-clad cottage seven miles from the city, two-thirds of an acre, a garden, twenty hens, and some scale-infested fruit-trees. Roses and honeysuckle for shade, and a good hammock make a farmer's life almost endurable. Still climbing up the hill of knowledge, tho' it is steeper than Buffalo street."

Yours for luck,

Nathan Banks.

Mr. Banks neglects to state that he has become an authority on American spiders, and that his scientific papers have attracted wide attention.

'91-'92, Graduate—Prof Vernon L. Kellogg is now professor of zoology and entomology at Stanford University. Some of his numerous positions have been assistant entomologist on the Samoan Explorations and a member of the U. S. Fish Commission. Prof. Kellogg has written many articles, some of which are: "Variation and Heredity in Insects," "The Scales of *Lepidoptera*," "The morphology and Development of the Mouth-Parts of Insects," and valuable papers upon the *Mallophaga* and a large, finely illustrated volume called "American Insects." He is co-editor with Dr. David Starr Jordan on the book called "Animal Life," and has also written a zoology for use in schools.

'92, B. S.—Prof. Mark V. Slingerland has held his present position, that of Assistant Entomologist of the Cornell Experiment Station since 1889. He was made Assistant Professor of Economic Entomology in Cornell University in 1899.

Prof. Slingerland has done much original investigation work in studying the life habits of injurious insects, and in devising and testing methods of combating them. He has written many very important bulletins on insect pests, among which the bulletins on the Wireworm, Cabbage Maggot, Pear Psylla, Codling-moth, Bud Moth, Peach Borer, Grape Root-worm, Grape Leaf-hopper, Grape Berry-moth, and Trap Lanterns are especially notable and have given him an enviable reputation both in this country and abroad. Many important papers have been contributed by him to the proceedings of the horticultural societies in New York and other states, and he is constantly contributing to the agricultural press and entomological journals of the country.

Prof. Slingerland's reputation as a photographer of insects is world-wide. His lantern slides taken from nature by himself and colored by his wife rank easily as the finest and most artis-

tic and accurate productions of the kind in existence.

'92, B. S. A.—Otajo Tackahashi returned to Japan soon after graduation and has been engaged as a teacher in the public schools of his country. In recent years he has been unable to do much work on account of ill health.

'92 and '98, Graduate—Prof. H. A. Morgan, B. S. A., who took graduate work here for several years, is now professor of zoology and entomology of the Univ. of Tennessee, and Director of the Tennessee Agricultural Experiment Station. Besides these two important positions he is state entomologist. Prof. Morgan's chief work has been a study of the life history of the cattle tick, having in view its complete eradication from the United States. Through his efforts there is a bill before Congress asking for an appropriation to carry on this good work.

'92, A. B.—Prof. C. O. Houghton tells us that he accepted the position of associate professor of Zoology in Delaware College and Entomologist in the Agricultural Experiment Station in 1902. At the college he has charge of general zoology, and entomology. Besides station reports and bulletins, Prof. Houghton contributes many articles to the "Entomological News."

'94, D. Sc.—Dr. E. P. Felt was the University fellow in entomology during 1892-1893, receiving Sigma Xi in 1893. After teaching natural science in several schools, he became assistant to the N. Y. State Entomologist in 1894, and was appointed acting State Entomologist in 1898. Now he is State Entomologist with his address as Geological Hall, Albany, N. Y. Dr. Felt is very prominent as a writer, an investigator and as a leading member of many scientific societies.

'94-'97, Special—Inokichi Kuwana took special work in Entomology for several years, leaving to continue his studies under Prof. Kellogg of Stanford University. While there he published several important papers on the coccidae of Japan and of California. Now he is government entomologist

at the Central Agricultural Experiment Station of Japan.

'95, M. Sc.—Prof. Lockhead has held a number of positions since leaving Ithaca. He was president of the Entomological Society of Ontario in 1902-04. For some time past and at present he occupies the Chair of Biology and Geology at the Ontario Agricultural College of Guelph, Canada. He is in the near future to become Dean of the School of Biology at the new McDonald Agricultural College near Montreal.

'95, B. S. A.—Rufus H. Petit is now spending his tenth year at the Agricultural College of Michigan. He is entomologist of the Experiment Station and a member of the Station Council. He has also charge of the Zoology department in that college, spending much of his time in teaching, while investigations fill up the spare moments.

'96, Grad.—Prof. S. J. Hunter became assistant professor of entomology at the Univ. of Kansas in 1896-'99, being appointed full professor of comparative zoology and entomology in 1901. At present he is the head of the Entomological Dept. Besides publishing a text-book for general and advanced students, Prof. Hunter has devoted much time to the biology and taxonomy of Coccidae and the morphology of artificial parthenogenesis, and several kindred topics.

'96, Grad.; '96-'97, Sp.—Mr. A. S. Quaintance is at present connected with the Bureau of Entomology, U. S. Dpt. of Agriculture, having in charge the investigations of deciduous fruit-tree insects. At present, with three assistants, he is giving special attention to the peach tree insects. This work is expected to be of great value.

'96—Glen W. Herrick is now Professor of Biology at the University of Mississippi, and Experiment Station Entomologist. He has published many bulletins on insects including several quite important ones on the mosquito. His address is Starkville, Miss.

[On account of lack of space, former Entomological students, arranged by classes will be continued in our May number.]

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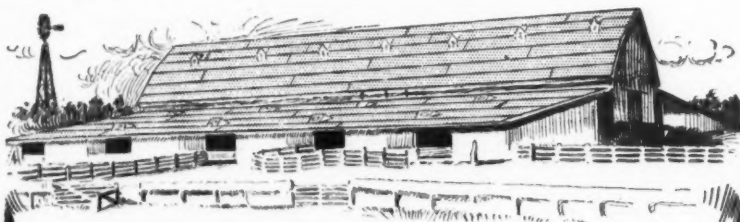
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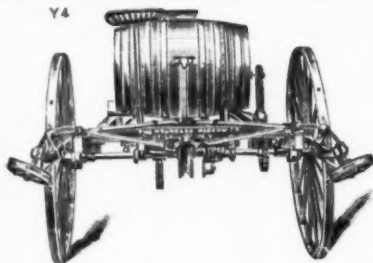
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I concluded to try the experiment on one acre and watch the result. I mixed one barrel of the solution composed of eight pounds of blue vitrol to forty gallons of water and applied it. When mixed ready for use the solution made forty-five gallons. The second day after the spraying the mustard was practically all withered and dead, but the leaves of the grain turned red and resembled a field of grain that was badly "rusty." Nearly everyone who saw it said: "You have killed the mustard, but you have killed the grain as well," and I thought so myself. Within two weeks the grain that had been sprayed improved so that it was the most thrifty portion of the field, and the improvement was plainly discernable up to the time of harvest, when we found that in that portion of the field no mustard had gone to seed, and the grain was easily 50 per cent. better than on the balance of the field. I have no hesitation in saying that this treatment will eradicate wild mustard from the land without material injury to the grain crop, but I believe that better results can be obtained by earlier application and reducing the strength of the solution to about six pounds of vitrol to forty gallons of water. This is the formula I will use next season, and I shall use it upon every acre of grain I sow.

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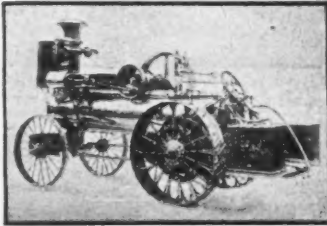
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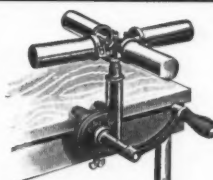
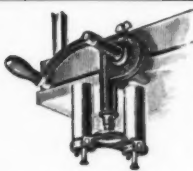
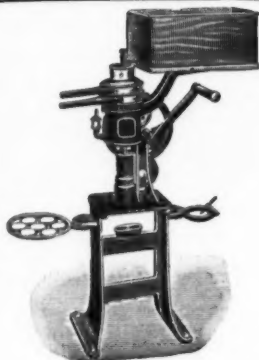
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